Calculations

Given: A0 = 2560 g

A1/2 = 1280 g

t = 5.26 years

Find k, the rate of decay

A = A0ekt

1280 = 2560e5.26k → k ≈ -0.131777

Find t when A = 10

10 = 2560e-0.131777t → t ≈ 42.08 years

Findings:

Given that the half-life of this particular low-level radioactive waste has a half-life of 5.26 years, it follows that the rate of decay is approximately -0.131777. If at most 10 grams of radioactive material gives off an acceptable level of radiation, then based on our group’s calculations it will take about 42.08 years (42 years and 1 month) for the waste disposal site to have an acceptable level of radiation. Please refer to the applet that we created to see a graphical representation of this solution.